AMENDMENTS TO THE DRAWINGS:

This Amendment encloses a replacement drawing sheet which corrects Figure 10 to include the legend "Prior Art."

Attachments: Replacement Sheet

REMARKS

An excess claim fee payment letter is submitted herewith for one (1) additional independent claim and seven (7) additional total claims.

Claims 1-27 are all the claims presently pending in the application. Claims 1-9 are amended to more clearly define the invention and claims 10-27 are added. Claims 1, 9, 13, and 25 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicants also note that, notwithstanding any claim amendments herein or later during prosecution, Applicants' intent is to encompass equivalents of all claim elements.

Claims 1-2 and 9 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Applicants' Admitted Prior Art. Claims 3-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Applicants' Admitted Prior Art in view of the Chikaraishi reference.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

A first exemplary embodiment of the claimed invention, as defined by, for example, independent claim 11, is directed to a torque sensor that includes a first shaft, a magnetism leakage preventing member on an outer periphery of the first shaft, and a magnetic first detecting cylinder on an outer periphery of the magnetism leakage preventing member. The magnetism

leakage preventing member is molded such that contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction.

A second exemplary embodiment of the claimed invention as recited by, for example independent claim 22, is directed to a method of manufacturing a torque sensor. The method includes providing a molding die, providing a first shaft in the molding die, providing a first detecting cylinder in the molding die, and injecting a resin into the molding die to mold a magnetism leakage preventing member.

Conventional torque sensors integrate a magnetism leakage preventing member, a first detecting cylinder and the first shaft by fitting these components together and by providing a pin to prevent axial and circumferential displacement of these components relative to each other.

However, the pins and corresponding pin holes increase the cost of each of these components.

Further, the first detecting cylinder and the magnetism leakage preventing member are press fit onto the first shaft and it is difficult to align the pin holes. Thereby, increasing the complexity and cost of integrating these components.

Additionally, the accuracy of the integration of these components is required to be high to reduced the affect of temperature variations on the clearances between the first detecting cylinder and the second detecting cylinder, and the first detecting cylinder and the third detecting cylinder. This further increases the complexity of integrating these components.

In stark contrast to the conventional torque sensors, the first exemplary embodiment of the present invention molds the magnetism leakage preventing member around the first shaft such that contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction and the second exemplary embodiment of the present invention provides a molding die, a first shaft in the molding die, a first detecting cylinder in the molding die, and injects a resin into the molding die to mold a magnetism leakage preventing member.

In this manner, the first shaft positively positions the magnetism leakage preventing member axially and/or circumferentially on the first shaft so that the torque can be detected with high accuracy despite temperature variations, and obviates the necessity of providing a pin (page, 16, line 25 - page 18, line 19).

II. THE PRIOR ART REJECTIONS

A. The Applicants' Admitted Prior Art

Regarding the rejection of claims 1-2 and 9, the Examiner alleges that the Applicants' Admitted Prior Art teaches the claimed invention. Applicants submit, however, that there are elements of the claimed invention which are neither taught nor suggested by the Applicants' Admitted Prior Art.

None of the applied references teaches or suggests the features of the claimed invention including: 1) a magnetism leakage preventing member that is molded around the first shaft such

that contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction (claims 1, 11, 13, and 26); and 2) providing a molding die, a first shaft in the molding die, a first detecting cylinder in the molding die, and injecting a resin into the molding die to mold a magnetism leakage preventing member (claims 9 and 25).

Rather, the Applicants' Admitted Prior Art describes conventional torque sensors that suffer the same problems that are discussed above.

In particular, the Applicants' Admitted Prior Art describes conventional torque sensors that integrate a magnetism leakage preventing member, a first detecting cylinder and the first shaft by press fitting these components together and by providing a pin to prevent axial and circumferential displacement of these components relative to each other.

It is the presence of the pin which resists axial and circumferential movement of the magnetism leakage preventing member on the first shaft. However, the pins and corresponding pin holes increase the cost of each of these components.

Further, the first detecting cylinder and the magnetism leakage preventing member are press fit onto the first shaft and it is difficult to align the pin holes, thereby increasing the complexity and cost of integrating these components.

Additionally, the accuracy of the integration of these components is required to be high to reduced the affect of temperature variations on the clearances between the first detecting cylinder and the second detecting cylinder, and the first detecting cylinder and the third detecting cylinder.

This further increases the complexity of integrating these components.

In stark contrast, the first exemplary embodiment of the present invention obviates any necessity for a pin by providing a magnetism leakage preventing member that is molded around the first shaft such that contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction (claims 1, 11, 13, and 26).

Additionally, the second exemplary embodiment of the present invention forms the magnetism leakage preventing member by providing a molding die, a first shaft in the molding die, a first detecting cylinder in the molding die, and injecting a resin into the molding die (claims 9 and 2).

The Applicants' Admitted Prior Art clearly does not teach or suggest these features of the present invention. Therefore, the Examiner is respectfully requested to withdraw this rejection of claims 1-2 and 9.

B. The Applicants' Admitted Prior Art in view of the Chikaraishi reference

Regarding the rejection of claims 3-8, the Examiner alleges that the Chikaraishi reference would have been combined with the Applicants' Admitted Prior Art to form the claimed invention. Applicants submit, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

That is, Applicants submit that one of ordinary skill in the art would readily recognize that the torque sensor that is disclosed by the Applicants' Admitted Prior Art is completely different from the torque sensor that is disclosed by the Chikaraishi reference.

As M.P.E.P. § 2143.01 states:

> "*If the proposed modification or combination of the prior art would change the principal of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious.*"

In the present instance, the Applicants' Admitted Prior Art describes a torque sensor that relies upon the modulation of magnetic fields from coils 108 and 109 by the teeth on the detecting cylinders 105, 106, and 107. The second detecting cylinder 106 is mounted on the second shaft 103 and the first detecting cylinder 105 is mounted on the first shaft 102. The first and second detecting cylinders 105 and 106 have teeth that modulate the magnetic field that is generated by the first coil 108 when the first shaft 102 and the second shaft 103 are rotated relative to each other.

In other words, the principle of operation of the torque sensor disclosed by the Applicants' Admitted Prior Art relies upon the modulation of a magnetic field by teeth on the ends of adjacent detecting cylinders.

In stark contrast, the Chikaraishi reference discloses a torque sensor that relies upon a completely different principle of operation.

In particular, the Chikaraishi reference discloses a torque sensor that mounts a

cylindrical member 10 onto an output shaft 3. The cylindrical member 10 includes rectangular windows 10a that extend over grooves 2a on an input shaft 2. A magnetic coil 16 is mounted on the cylindrical member 10 that generates a magnetic field that is modulated by the interaction of the windows 10a on the cylindrical member 10 and the grooves 2a on the input shaft 2 (col. 9, line 51 - col. 10, line 6).

In other words, the principle of operation of the torque sensor disclosed by the Chikaraishi reference relies upon the modulation of a magnetic field by the interaction between windows in a cylindrical member and grooves on an input shaft.

The Chikaraishi reference does not disclose detecting cylinders, let alone disclose relying upon the modulation of a magnetic field by teeth on the ends of adjacent detecting cylinders as the.

Therefore, the torque sensor that is disclosed by the Chikaraishi reference clearly relies upon a completely different principle of operation for measuring torque than the torque sensor that is disclosed by the Applicants' Admitted Prior Art.

Indeed, as will be explained in detail below, the Examiner's alleged modification of substituting the cylindrical member 10 that is disclosed by the Chikaraishi reference for the magnetism leakage preventing member that is disclosed by the Applicants' Admitted Prior Art would destroy the principle of operation of the torque sensor that is disclosed by the Applicants' Admitted Prior Art by allowing the input shaft to affect the magnetic field, rather than preventing leakage of the magnetism to the input shaft.

Further, the Applicants' Admitted Prior Art is directed to providing a torque

sensor that integrates a magnetism leakage preventing member, a first detecting cylinder and the first shaft to detect torque without requiring a pin and while still preventing temperature variations from affecting the accuracy of the torque sensor.

In stark contrast, the Chikaraishi reference is directed to the completely different problem of providing a torque sensor that includes a cylindrical member having windows and grooves on an input shaft to detect torque (col. 1, lines 18-40) and to reliably mount the cylindrical member on the output shaft (col. 1, lines 41 - 61).

One of ordinary skill in the art who was concerned with providing a torque sensor that integrates a magnetism leakage preventing member, a first detecting cylinder and the first shaft to detect torque without requiring a pin and while still preventing temperature variations from affecting the accuracy of the torque sensor as the Applicants' Admitted Prior Art is concerned with providing would not have referred to the Chikaraishi reference because the Chikaraishi reference is directed to the completely different problem of providing a torque sensor that reliably mounts a cylindrical member having windows and grooves on an input shaft to detect torque. Thus, the references would not have been combined.

Further, contrary to the Examiner's allegation, the Chikaraishi reference does not teach or suggest a magnetism leakage preventing member.

Indeed, the Chikaraishi reference actually teaches away from providing a magnetism leakage preventing member.

The magnetism leakage preventing member that is disclosed by the Applicants'

Admitted Prior Art is adapted to prevent leakage of magnetism.

In particular, the magnetism leakage preventing member that is disclosed by the Applicants' Admitted Prior Art is adapted to prevent the leakage of magnetism from the first and second coils 108 and 109 to the first shaft 102. This prevention of leakage of magnetism into the first shaft 102 prevents the first shaft 102 from affecting the magnetic field that is generated by the first and second coils 108 and 109. Thereby, ensuring that only the interaction of the teeth on the detecting cylinders 105 - 107 modulate the magnetic field.

The Examiner alleges that the cylindrical member 10 that is disclosed by the Chikaraishi reference corresponds to the claimed magnetism leakage preventing member.

However, in stark contrast to the Examiner's allegation, the cylindrical member 10 includes windows 10a that are specifically designed to permit magnetism to leak therethrough so that the grooves on the input shaft will modulate the magnetic field generated by a coil unit 16 (col. 9, line 51 - col. 10, line 6).

In other words, the Chikaraishi reference specifically teaches that the cylindrical member 10 is intended to permit leakage of magnetism rather than to prevent leakage of magnetism.

Further, in stark contrast to the operation of the torque sensor that is described by the Applicants' Admitted Prior Art, which includes a magnetism leakage preventing member to prevent a shaft from affecting the magnetic field, the Chikaraishi reference provides a cylindrical member that includes windows specifically designed to allow the

input shaft to affect the magnetic field.

Therefore, the Chikaraishi reference specifically teaches away from the Examiner's proposed modification.

Moreover, even assuming arguendo that one of ordinary skill in the art would have been motivated to combine these references, the combination would not teach or suggest each and every element of the claimed invention.

As explained above, the Applicants' Admitted Prior Art does not teach or suggest the features of the claimed invention including: 1) a magnetism leakage preventing member that is molded around the first shaft such that contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction (claims 1, 11, 13, and 26); and 2) providing a molding die, a first shaft in the molding die, a first detecting cylinder in the molding die, and injecting a resin into the molding die to mold a magnetism leakage preventing member (claims 9 and 25).

These features are important for the ensuring that the first shaft positively positions the magnetism leakage preventing member axially and/or circumferentially on the first shaft so that the torque can be detected with high accuracy despite temperature variations, and obviates the necessity of providing a pin (page, 16, line 25 - page 18, line 19).

The Chikaraishi reference does not remedy these deficiencies.

The Chikaraishi reference clearly does not teach or suggest a magnetism leakage preventing member that is molded around the first shaft such that contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction.

Rather, the Chikaraishi reference merely discloses a cylindrical member 10 that is mounted on an output shaft.

As explained above, the Chikaraishi reference clearly does not teach or suggest a magnetism leakage preventing member, let alone contact between the magnetism leakage preventing member and the first shaft prevents displacement of the magnetism leakage preventing member with respect to the first shaft in at least one of an axial direction and a circumferential direction.

The Chikaraishi reference also does not teach or suggest providing a molding die, a first shaft in the molding die, a first detecting cylinder in the molding die, and injecting a resin into the molding die to mold a magnetism leakage preventing member (claims 9 and 25).

Lastly, regarding the means plus function recitations, the Examiner has failed to interpret the claims to read only on the structures or materials disclosed in the specification and "equivalents thereof." The Federal Circuit has made it clear that the Office is required to interpret means plus function language in accordance with 35 U.S.C. § 112, sixth paragraph (see M.P.E.P. §2106; *In re Donaldson*, 16 F.3d 1189, 1193 (Fed.

Cir. 1994) and *In re Alappat,* 33 F.3d 1526, 1540 (Fed. Cir. 1994)). Clearly, the Examiner has failed to interpret the claims to read only on the structures or materials disclosed by the present specification and "equivalents thereof."

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 3-8.

III. FORMAL MATTERS AND CONCLUSION

The Office Action objects to the drawings. This Amendment encloses a replacement drawing sheet which corrects Figure 10 to include the legend "Prior Art." Applicants respectfully request withdrawal of this objection.

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-27, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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